

**COLORADO RIVER RECOVERY PROGRAM  
FY-2006 - 2007 PROPOSED SCOPE OF WORK for:**

**Project No.:**109

Northern Pike Control in the Middle Green River

Lead Agency: Utah Division of Wildlife Resources

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<b><u>Category:</u></b>	<b><u>Expected Funding Sources:</u></b>
<input type="checkbox"/> Ongoing project	<input checked="" type="checkbox"/> Annual funds
<input checked="" type="checkbox"/> Ongoing-revised project	<input type="checkbox"/> Capital funds
<input type="checkbox"/> Requested new project	<input type="checkbox"/> Other (explain)
<input type="checkbox"/> Unsolicited proposal	

I. Title of Proposal:

Northern Pike Control in the Middle Green River.

II. Relationship to RIPRAP:

General Recovery Program Support Action Plan

III. Reduce negative impacts of nonnative fishes and sportfish management activities (nonnative and sportfish management).

III.A. Reduce negative interactions between nonnative and endangered fishes.

III.A.2. Identify and implement viable active control measures.

III.A.2.c. Implement and evaluate the effectiveness of viable active control measures.

Green River Action Plan: Mainstem

III.A.4.a Northern pike in the middle Green River.

III. Study Background/Rationale and Hypotheses:

Nonnative fishes have become established in rivers of the upper Colorado River basin, and certain species have been implicated as contributing to reductions in the distribution and abundance of native fishes primarily through predation and competition (e.g., Hawkins and Nesler 1991; Lentsch et al. 1996; Tyus and Saunders 1996). Controlling problematic nonnative fishes is necessary for recovery of endangered humpback chub (*Gila cypha*), bonytail chub (*G. elegans*), Colorado pikeminnow (*Ptychocheilus lucius*),

and razorback sucker (*Xyrauchen texanus*) in the upper Colorado River basin. The northern pike (*Esox lucius*) is a significant predatory and competitive threat to the endangered and other native fishes, and was rated as one of the six nonnative species of greatest concern by experts in the Colorado River basin (Hawkins and Nesler 1991). Northern pike became established in the Yampa River in the early 1980's. Originally introduced as game fish in Elkhead Reservoir in 1977, the species escaped and invaded the Yampa River. Since then, northern pike have established a reproducing population in the upper Yampa River and have expanded their number and range within the Yampa and Green rivers; there is evidence of successful spawning in Stewart Lake near Jensen, Utah and in Old Charlie Wash on the Ouray National Wildlife Refuge. A control program for northern pike in the Yampa River was initiated in 1999.

Based on catch rates from previous years' sampling activities associated with Basin-wide Razorback Sucker Monitoring, the northern pike population in the middle Green River was rapidly increasing. Capture rates of northern pike during Basin-Wide Razorback Sucker Monitoring increased from 48 collected in 1997 to 202 collected in 1999 (Table 1). Removal of Northern pike in the middle Green River was initiated in 2001 and resulted in the removal of 248 northern pike. Based on trends in catch rates of subsequent years, removal efforts have been successful at significantly reducing the number of northern pike in the middle Green River. Control efforts in 2003 and 2004 has resulted in the capture of less than 30 northern pike. Effort to control northern pike in the middle Green River will be reduced in 2005 to a maintenance level. Northern pike populations will be monitored to determine if this lower level of effort is sufficient to minimize threats to endangered and other native fishes.

Table 1. Collections of northern pike during Basin-Wide Razorback Sucker Monitoring netting: 1996-1999 and removal efforts 2001 - 2004.

Year	Number Captured	Number Recaptured
1996	52	-
1997	48	7
1998	92	17
1999	202	68
2001	248 removed	
2002	42 removed	
2003	22 removed	
2004	27 removed	

#### IV. Study Goals, Objectives, End Product:

The purpose of this project is to continue active adult northern pike control in the middle Green River. The goal of northern pike control in the middle Green River is to sufficiently reduce the abundance of adults such that predatory and competitive impacts on growth, recruitment, and survival of endangered and other native fishes are minimized. The study objectives are to:

1. Capture and remove (lethal) adult northern pike from reaches of the middle Green River.
2. Maintain low occurrence of adult northern pike in the middle Green River.
3. Determine the efficiency of removal efforts.
4. Identify the means and levels of northern pike control necessary to minimize the threat of predation/competition on endangered and other native fishes.

The end products will be reduction of adult northern pike, evaluation of the effectiveness of removal for the development of an effective control program.

#### V. Study Area

The study area will include sections of the Green River from Island Park (RMI 335) to the confluence of the White River (RMI 246). Selected reaches of this section will be sampled dependent on catch rates, time of year and available habitat.

#### VI. Study Methods/Approach

Known concentration areas for northern pike in the middle Green River during spring include: mouth of Brush Creek (RMI 304.5), Cliff Creek (RMI 302.9), Stewart Lake Drain (RMI 300.0), Ashley Creek (RMI 299.0) and Sportsman Drain (RMI 296.6). These areas will be targeted for sampling at weekly intervals during late March - June. The sampling period will be adjusted based on timing and duration of spring flows but will generally be from late March through June.

Table 2. Gear types, number of samples and description of sampling effort.

<b>Gear Type</b>	<b>Number of Samples</b>	<b>Description</b>
Fyke Nets	100	24 to 48 hour sets three times per week in low velocity habitats
Trammel Nets	100	1 hour sets in suitable low flow habitats and used for “block and Shock / Scare and Snare”
Electrofishing	~ 30 hrs	electrofishing from Island Park to the White River confluence in conjunction with trammel nets.

Removal will primarily be done with the use of fyke nets but will also include trammel nets and electrofishing. (Table 2). All target and endangered fish collected will be counted, weighed, measured and checked for marks or tags; target nonnative fishes will be removed; and native fishes will be returned alive to the site of capture. The contents of stomachs of northern pike. Cliethra from all northern pike collected will be removed, preserved and labeled for later age analysis. Endangered fish species will be scanned for a PIT tag, tagged if needed, then released near the area of capture. The effectiveness of northern pike removal efforts will be evaluated using trends in CPUE.

#### VII. Task Description and Schedule (FY-2006)

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|------------------------|---|
| Task 1. October - Dec. | Analyze northern pike cliethra collected during FY-2005 for age and growth. |
| Task 2. October - Dec. | Analyze preserved stomachs collected from northern pike during FY-2005.     |
| Task 3. March - June   | Capture and remove northern pike.   |
| Task 4. July - October | Data entry and analysis of field data. Equipment maintenance.               |
| Task 5. November       | Prepare Recovery Program FY-2006 annual progress report.                    |

VIII. FY-2006 Work:

- Deliverables/Due Dates

Recovery Program annual progress report: November 2006

-Budget (Non-Capital Expenses) by task:

	Work days	Cost
Task 1. Age analysis		
Labor		
Biologist (\$340/day)	6	2,040
Technicians (\$195/day)		0
Supplies		100
Task subtotal		2,140
Task 2. Stomach analysis		
Labor		
Technicians (\$195/day)	5	975
Supplies		100
Task subtotal		1,075
Task 3. Field Work		
Labor		
Biologist (\$340/day)	30	10,200
Technicians (\$195/day)	60	11,700
Travel (vehicle mileage and rental; \$36/day/vehicle) <sup>a</sup>	20	720
Equipment (maint. & repair) <sup>b</sup>		1,000
Task subtotal		23,620

<sup>a</sup> Calculated as average miles traveled per day \* cost per mile + daily rental fee = 75 \* \$0.41 + \$5 = \$35.75/day

<sup>b</sup> Includes repair or replacement of outboard motor lower units, electrofishing, fyke net and trammel net repair and replacement.

#### Task 4. Data Entry/Analysis

##### Labor

Biologist (\$340/day)	5	1,700
Technician (\$195/day)	2	390
Supplies		200
Task subtotal		2,290

#### Task 5. Report Preparation

##### Labor

Biologist (\$340/day)	5	1,700
Task subtotal		1,700

FY 2006 Total      \$30,825

#### FY-2007 Work:

##### - Deliverables/Due Dates

Recovery Program annual progress report: November 2007

##### -Budget (Non-Capital Expenses) by task

	Work days	Cost
<u>Task 1. Age analysis</u>		
Labor		
Biologist (\$350/day)	6	2,100
Technicians (\$201/day)		0
Supplies		100
Task subtotal		2,200

#### Task 2. Stomach analysis

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##### Labor

Technicians (\$201/day)	5	1,005
Supplies		100
Task subtotal		1,105

#### Task 3. Field Work

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##### Labor

Biologist (\$350/day)	30	10,500
Technicians (\$201/day)	60	12,060
Travel (vehicle mileage and rental; \$36/day/vehicle) <sup>a</sup>	20	720
Equipment (maint. & repair) <sup>b</sup>		1,000
Task subtotal		24,280

<sup>a</sup> Calculated as average miles traveled per day \* cost per mile + daily rental fee = 75 \* \$0.41 + \$5 = \$35.75/day

<sup>b</sup> Includes repair or replacement of outboard motor lower units, electrofishing, fyke net and trammel net repair and replacement.

#### Task 4. Data Entry/Analysis

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##### Labor

Biologist (\$350/day)	5	1,750
Technician (\$201/day)	2	402
Supplies		200
Task subtotal		2,352

#### Task 5. Annual Report

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##### Labor

Biologist (\$350/day)	5	1,750
Task subtotal		1,750

FY 2007 Subtotal \$31,687

## **FY 2007 Synthesis Report**

### **Task 4. Data Entry/Analysis**

#### Labor

Biologist (\$347/day)	5	1,735
Technician (\$198/day)	2	396
Supplies		200
Task subtotal		2,331

### **Task 5. Synthesis Report**

#### Labor

Project Leader (\$446/day)	5	2,230
Biologist (\$347/day)	15	5,205
Supplies		200
Travel		1,000
Task subtotal		7,635
<b>Synthesis Report Total</b>		<b>\$9,966</b>

## IX. Budget Summary

FY2006	\$30,825
FY2007	\$31,687

**Note: FY 2007 Total = \$41,653 which includes Synthesis Report**

## X. Reviewers:

C. McAda, T. Modde, and two anonymous reviewers (reviewed original proposal).

## XI References:

Hawkins, J.A., and T.P. Nesler. 1991. Nonnative fishes of the upper Colorado River basin: an issue paper. Final Report of Colorado State University Larval Fish Laboratory to Upper Colorado River Endangered Fish Recovery Program, Denver, Colorado.



- Lentsch, L. D., R. T. Muth, P. D. Thompson, B. G. Hoskins, and T. A. Crowl. 1996. Options for selective control of nonnative fishes in the upper Colorado River basin. Utah Division of Wildlife Resources Publication 96-14, Salt Lake City.
- Tyus, H. M., and J. F. Saunders, III. 1996. Nonnative fishes in natural ecosystems and a strategic plan for control of nonnatives in the Upper Colorado River Basin. Final Report of University of Colorado Center of Limnology to Upper Colorado River Endangered Fish Recovery Program, Denver, Colorado.